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[Second Edition.]

PATENT SPECIFICATION

Application Date : Dec. 18, 1928. No. 37,381 / 28. **326,771**

Complete Left : Aug. 6, 1929.

Complete Accepted : March 18, 1930.

PROVISIONAL SPECIFICATION.

Improvements in and relating to Electric Discharge Tubes.

We, ALBERT EDWARD CHAPMAN, a British Subject, of 125, Stanley Park Road, Carshalton, Surrey, and JOHN VIELLE, a British Subject, of 65, London Wall, London, E.C. 2, do hereby declare the nature of this invention to be as follows :—

The present invention relates to improvements in electric discharge tubes and applies more particularly to evacuated, or gaseous electric discharge tubes of the type such as are used for advertising or other purposes of illumination, and in which the discharge takes place between electrodes disposed in spaced relationship one to the other.

The object of the present invention is to so construct a discharge tube that there is an increase of illumination at appreciably lower operating watts expenditure than has hitherto been effected, the construction and arrangement by which this effect is produced, being such that the tendency of variations of light intensity owing to eddy or other fluctuations of the operating current is also greatly reduced.

According to the present invention a discharge tube is so constructed that the electronic and protonic streams in one portion of the tube are caused to flow in an exactly opposite direction from the direction of flow of the electronic and protonic stream respectively in another portion of the tube, the direction of flow of the said streams in both portions of the tube being in parallel or substantially parallel planes and in close proximity one to the other whereby mutually inductive and capacitative effects are produced between the said oppositely flowing streams, the said inductive effect acting to reduce the resistance of the whole tube, thus causing a considerable increase of illumination for a given watts consumption, the arrangement, moreover, being such that the rate of flow at all portions of the tube is equal or substantially equal for equal cross sectional areas.

According to one form of the present invention, a discharge tube is formed in two portions of approximately equal length and section which constitute separate vessels disposed side by side throughout their length, and in close proximity one to the other, and where necessary bent or formed to the desired shape, each chamber being provided at its extremities with electrodes.

The electrodes of each of the two vessels constituting the tube are at one end thereof connected to a centre tapping of the secondary winding of a transformer, which tapping is at zero or earth potential, the electrodes at the other ends of the said vessels of the tube being connected respectively to the ends of the said secondary winding of the said transformer which supplies the operating voltage.

As will be readily seen, the form of the invention just above described affords a greater factor of safety in the operation and manipulation of the device than has hitherto been ordinarily attainable.

A tube constructed in accordance with the present invention could, however, if desired be operated without the use of a centre tapping, in which case the electrodes normally connected to the centre tapping would be simply connected together, or an external adjustable conductor or electrode may be employed connected to any intermediate point of the secondary of the transformer.

The vessels forming the tube may be partially coated with a metallic coating to intensify the light by reflecting the rays in the required direction, and to which metallic coating may if desired be applied a suitable potential to counteract any detrimental capacity effect between the tube and any external body adjacent thereto, such for instance as metal girders of a building or a damp wall near which the tube is mounted.

A tube as above described forms a very suitable non filament substitute for filament lamps employed for domestic, industrial, commercial and other purposes.

Dated this 18th day of December, 1928.

J. E. EVANS-JACKSON & Co.,
Agents for the Applicants.

[*Price* 1*s*.]

Price 4s 6d

COMPLETE SPECIFICATION.

Improvements in and relating to Electric Discharge Tubes.

We, ALBERT EDWARD CHAPMAN, a British Subject, of 125, Stanley Park Road, Carshalton, Surrey, and JOHN VIELLE, a British Subject, of 65, London Wall, London, E.C. 2, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

The present invention relates to improvements in electric discharge tubes and applies more particularly to evacuated, or gaseous electric discharge tubes of the type such as are used for advertising or other purposes of illumination, and in which the discharge takes place between electrodes disposed in spaced relationship one to the other.

The object of the present invention is to so construct a discharge tube that there is an increase of illumination at appreciably lower operating watts expenditure than has hitherto been effected, the construction and arrangement by which this effect is produced, being such that the tendency of variations of light intensity owing to eddy or other fluctuations of the operating current is also greatly reduced.

According to the present invention, a discharge tube is formed in two portions of approximately equal length and section which in effect constitute separate discharge vessels disposed side by side throughout their length, and in close proximity one to the other, and where necessary bent or formed to the desired shape, each chamber being provided at its extremities with an electrode.

One of the electrodes of each of the two vessels constituting the tube is at one end thereof connected to a centre tapping of the secondary winding of a transformer, which tapping is at zero or earth potential, the electrodes at the other ends of the said vessels of the tube being connected respectively to the ends of the said secondary winding of the said transformer which supplies the operating voltage.

Instead of providing four electrodes, two for each of the portions of the tube forming the discharge vessels as above described, three electrodes may be employed by providing only one zero potential electrode which serves as a zero electrode for both portions of the tube.

As will be readily seen, a tube constructed in accordance with the present invention not only affords a greater factor of safety in operation and manipulation than has hitherto been ordinarily obtainable, but, owing to the close proximity of the two portions of the tube, possesses the combined advantage that the mutually inductive and capacitative effects between the two portions of the tube act to reduce the resistance of the tube.

In order that the invention may be the better understood the accompanying drawings are appended in which :—

Fig. 1 shows one form of the present invention.

Figs. 2 and 3 show further forms of the invention.

Referring to Fig. 1 of the drawings, the tube comprises two parallel limbs or portions 1, 2, bent back one upon the other as indicated at 3, and provided within their respective outer ends with electrodes 4, 5, which are connected to the outer ends of a centre tapped secondary winding of a transformer 6.

Within the tube at the point 3 there is provided an electrode 7 which is connected to the centre tapping of the secondary winding of the transformer, this electrode therefore being always at zero potential.

In the modification shown in Fig. 2 the portions 1 and 2, instead of being arranged parallel one to the other, are intertwined.

In the arrangement shown in Fig. 3 the portions 1 and 2 of the tube are disposed side by side and bent into the form of a double spiral, the zero potential electrode 7 being disposed at the centre of the spiral.

The tube, moreover, may be partially coated with a metallic coating to intensify the light by reflecting the rays in the required direction, and to which metallic coating may, if desired, be applied a suitable potential to counteract any detrimental capacity effect between the tube and any external body adjacent thereto, such for instance, as metal girders of a building or a damp wall near which the tube is mounted.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is :—

1. An electronic discharge tube of the type specified, comprising two discharge vessels arranged side by side and in close proximity one to the other, an electrode

or electrodes at one end of said tube or vessels connected to a zero potential tapping of the secondary winding of a transformer, and electrodes at the other ends of the vessels connected to the said transformer winding at points of inverse potential, substantially as and for the purpose set forth.

2. An electronic discharge tube according to Claim 1 in which the operating voltage thereof is reduced by providing at a suitable point within or upon said tube an electrode which is maintained at zero potential, and between which and the electrodes disposed within the respective portions of the tube the discharge takes place.

3. An electronic discharge tube constructed, arranged and operating substantially as described and with reference to the accompanying drawings.

Dated this 6th day of August, 1929.

J. E. EVANS-JACKSON & Co.,
Agents for the Applicants.

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[Wt. 95A.—50/12/1932.]

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Fig:1.

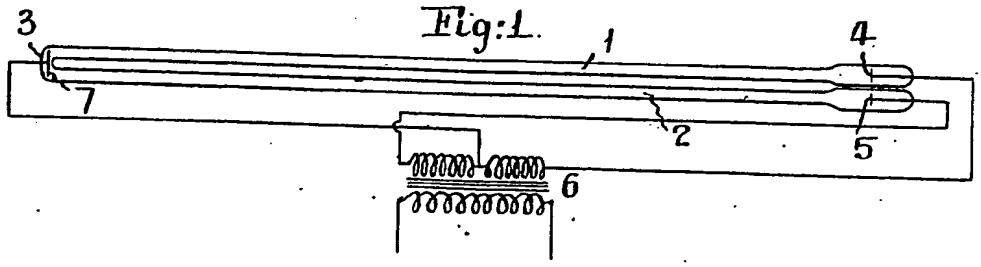

Fig:2

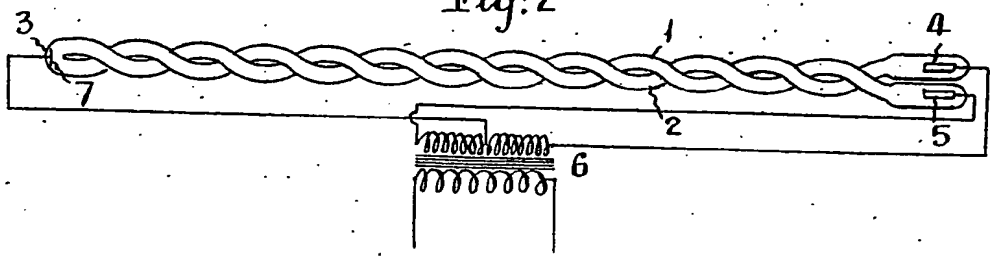

Fig:3.

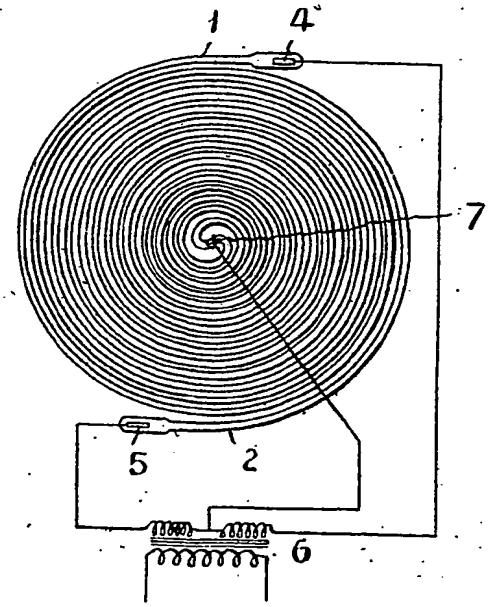

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Fig:1.

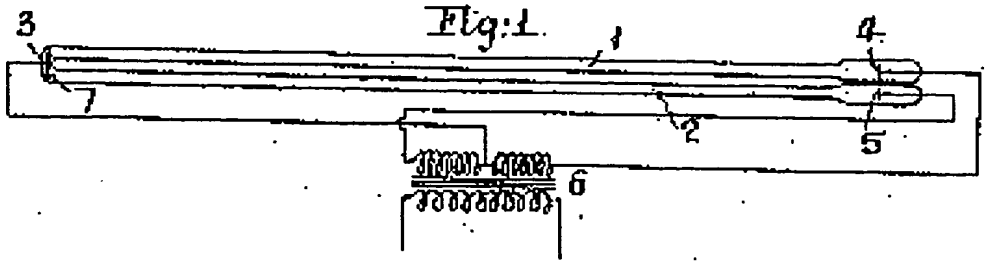


Fig:2

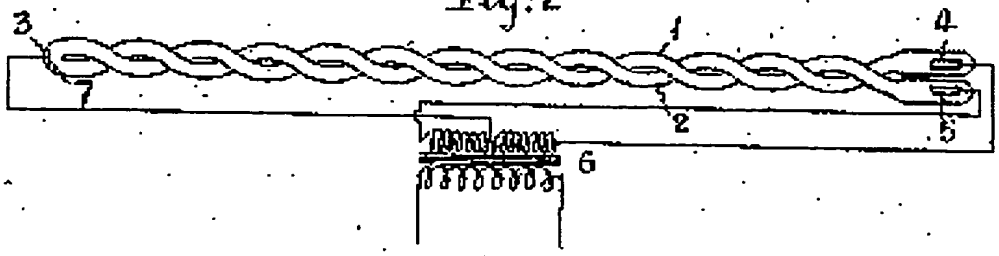
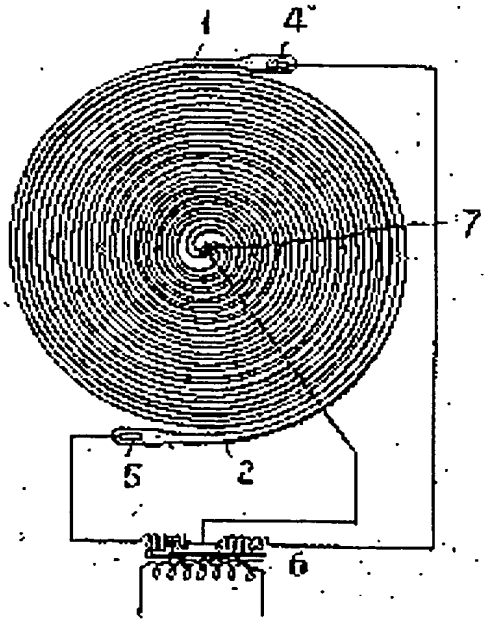


Fig:3.



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